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**FINAL RADIOLOGICAL PRELIMINARY ASSESSMENT WORK PLAN NSWC
DAHLGREN VA**

07/01/2021
TETRA TECH

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Naval Facilities Engineering Systems Command
Washington
Washington, D.C.

Final
Radiological Preliminary Assessment Work Plan

Naval Support Facility Dahlgren
Dahlgren, Virginia

July 2021

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FINAL

RADIOLOGICAL PRELIMINARY ASSESSMENT WORK PLAN

**NAVAL SUPPORT FACILITY DAHLGREN
DAHLGREN, VIRGINIA**

**COMPREHENSIVE LONG-TERM
ENVIRONMENTAL ACTION NAVY (CLEAN) CONTRACT**

Submitted to:

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July 2021

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Table of Contents

Table of Contents	iii
Attachments	iv
Tables	iv
Figures	iv
Acronyms and Abbreviations.....	v
1.0 Introduction.....	1-1
1.1 Project Management Details	1-2
1.2 Preliminary Assessment Objectives	1-3
2.0 Site Description and Background	2-1
2.1 Facility Description	2-1
2.2 Areas to be Evaluated in the Preliminary Assessment.....	2-2
3.0 Preliminary Assessment Approach/Methodology	3-1
3.1 Collection and Review of Available Information	3-1
3.2 Site Visit	3-2
3.3 Summary of Naval Archive/Naval Aviation Archive Review	3-3
3.4 Summary of Interviews.....	3-3
3.5 Data Evaluation.....	3-4
4.0 Overall Project Approach and Deliverables	4-1
5.0 References	5-1

Attachments

- A Checklist for Site Visit
- B PA Interview Questionnaire
- C Responses to Regulator Comments

Tables

- 1 Areas Included in the Radiological Preliminary Assessment for NSF Dahlgren
- 2 Site Number Crosswalk Table for NSF Dahlgren

Figures

- 1 Comparison of the Radiation Survey and Site Investigation Process with the CERCLA Superfund Process and the RCRA Corrective Action Process
- 2 Site Location Map
- 3 Location of Areas to be Evaluated in the Preliminary Assessment

Acronyms and Abbreviations

AEC	Atomic Energy Commission
APP	Accident Prevention Plan
BRMP	Basewide Radiological Management Plan
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CLEAN	Comprehensive Long-Term Environmental Action Navy
CSM	Conceptual site model
CTO	Contract Task Order
DOD	Department of Defense
DOE	Department of Energy
DON	Department of the Navy
EEA	Explosives Experimental Area
EPA	Environmental Protection Agency
ER,N	Environmental Restoration, Navy
G-RAM	General radioactive material
MARSSIM	Multi-Agency Radiation Survey and Site Investigation Manual
NARM	Naturally-occurring and accelerator-produced radioactive materials
NAVFAC	Naval Facilities Engineering Systems Command
NRC	Nuclear Regulatory Commission
NRMP	Naval Radioactive Materials Permits
NRSC	Naval Radiation Safety Committee
NSF	Naval Support Facility
PA	Preliminary Assessment
RSCS	Radiation Safety & Control Services, Inc.

SAP	Sampling and Analysis Plan
SI	Site Inspection
SME	Subject Matter Expert
SSHP	Site Safety and Health Plan
TENORM	Technologically enhanced naturally occurring radioactive materials
TSP	Task-Specific Plan

1.0 Introduction

This Radiological Preliminary Assessment (PA) Work Plan for Naval Support Facility (NSF) Dahlgren was prepared by Tetra Tech for the United States Department of the Navy (DON), Naval Facilities Engineering Systems Command (NAVFAC) Southeast, under Contract Task Order (CTO) N4008019F4808 of the Comprehensive Long-Term Environmental Action Navy (CLEAN) Contract Number N6247016D9008.

The Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) process to investigate, characterize, and remediate potential hazardous substances under the oversight of the Environmental Protection Agency (EPA) or the appropriate state agency also applies to radioactive materials, including technologically enhanced naturally occurring radioactive materials (TENORM), and naturally-occurring and accelerator-produced radioactive materials (NARM), in addition to byproduct, source, and special nuclear materials (DON, 2018). General radioactive material (G-RAM) includes TENORM and NARM, in addition to byproduct, source, and special nuclear materials. G-RAM encountered at Environmental Restoration, Navy (ER,N) Program sites takes various forms such as contaminated soil, luminescent dials, or sediment in drain traps (see Section 2.1). Typical sites that may reasonably be suspected of containing G-RAM Navy-wide across all Navy Installations include former radium dial maintenance areas (e.g., radium paint shops and associated drain lines and exterior surfaces) and waste disposal areas where G-RAM products were used and disposed; particularly at installations performing ship and aircraft maintenance (DON, 2018). However, the mission history of NSF Dahlgren does not consist of ship and aircraft maintenance.

The Radiological PA will be conducted to satisfy the requirements of the CERCLA and will be prepared generally following the EPA Guidance for Performing PAs under CERCLA (EPA, 1991) and the DON Environmental Restoration Program Manual (DON, 2018). As indicated by EPA (1991), variation from the PA Guidance is acceptable, particularly at Federal facilities, as all aspects of the guidance may not be applicable. Therefore, the objective of this PA Work Plan is to describe the items that will be considered and evaluated in the PA report.

EPA, the Department of Defense (DoD), Department of Energy (DOE), and the Nuclear Regulatory Commission (NRC) developed the Multi-Agency Radiation Survey and Site Investigation Manual (MARSSIM) to be consistent with CERCLA and provide guidance for investigation of soil contamination at radiologically-impacted sites (EPA, DOE, DOD, and NRC, 2000). MARSSIM uses a multi-phase approach to address radioactive contamination issues. Its application at a site or in a specific situation requires consultation with the Naval Sea Systems Command Detachment Radiological Affairs

Support Office and appropriate regulators, or agency representatives. Figure 1, derived from the MARSSIM, illustrates the relationship between the various agency processes and is detailed further in the following subsections. The scope of the current CTO includes conducting the PA under CERCLA so this work plan only focuses on the activities that will be conducted as part of the PA. Separate work plans will be prepared as part of the Site Inspection (SI). Section 4 of this work plan presents a list of the primary deliverables.

1.1 Project Management Details

Tetra Tech is the prime contractor for this project but is being supported by Radiation Safety & Control Services, Inc. (RSCS) by providing radiological support as described in more detail below.

Daily activities will be directed by the Tetra Tech Project Manager, Mr. Aaron Bernhardt. He will focus on managing overall contract performance, interacting and strategizing with the DON project team, communicating with team members, preparing reports, attending meetings, coordinating contract issues with the project team, providing required project support functions, and maintaining the project schedule.

Lawson Bailey will serve as the Tetra Tech radiological subject matter expert (SME). He will manage the research and analysis task by performing reviews of existing information identified during previous investigations. He will also provide direction to RSCS personnel on information needs, searches, and data evaluation. He will perform additional data searches at Naval Archive locations that have not previously been visited. He will also manage the development of project technical work plan documents (Sampling and Analysis Plans [SAPs], Accident Prevention Plan/Site Safety and Health Plan [APP/SSHP], Basewide Radiological Management Plan [BRMP], and Task-Specific Plans [TSPs]) and oversee all field investigations performed by RSCS. He will lead the preparation of all site reports and responses to regulatory comments on all documents.

RSCS will provide mid- and senior-level health physicist personnel to review existing data to determine if recommendations from previous investigations are supported by the existing data. They will assist in additional data searches and identify any data gaps that need to be researched. They will focus on reviewing recommendations from previous investigations and determining if there is sufficient information and technical justification for a No Further Action designation. RSCS will provide assistance in the development of project technical work documents (SAP, APP/SSHP, BRMP, TSP, etc.) at the direction of the project SME. They will perform all identified site investigations (e.g., surveys, sampling) and will assist in the preparation of project reports as well as responses to regulatory comments on all documents.

RSCS maintains a Radioactive Material License, New Hampshire Radioactive Materials License No. 381R, that positions RSCS to provide radiological support and decontamination and decommissioning services to clients throughout the United States who do not have this capacity on their own site license. This license allows RSCS to take control of an unlicensed facility, such as a legacy site, and implement radiation safety and radiological survey and sampling programs in support of decontamination and decommissioning activities. This includes the packaging, processing, temporary storage and transportation for disposal or transfer of radioactive materials and contaminated items.

RSCS provides services outside the state of New Hampshire through reciprocity agreements. In the event work at NSF Dahlgren requires a radioactive materials license, RSCS would obtain reciprocity from the NRC as the work would be at a Federal facility.

1.2 Preliminary Assessment Objectives

The PA/SI phase of the response action process evaluates potential DON ER,N Program sites or areas at an installation to determine if a site or area should be considered for removal action or further response action. This determination is based on an assessment of whether there has been a release subject to CERCLA §104, defined as: (a) any hazardous substance (as defined under CERCLA; 40 Code of Federal Regulations Part 302.4, Designation of Hazardous Substances) released or where there is a substantial threat of such a release into the environment; or (b) a release or substantial threat of release into the environment of any pollutant or contaminant which may present an imminent and substantial danger to the public health or welfare. Because some of the areas included in this PA were, or are being evaluated under CERCLA, the PA will only focus on the radiological portion of the areas. With that in mind, the primary objectives of the Radiological PA are to:

- Present a summary of the areas discussed in Section 2.2 including a site description, operational history, current site status, and potential historical radiological uses.
- Develop the conceptual site model (CSM).
- Provide recommendations regarding whether the area needs to proceed to an SI for radiological constituents.

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2.0 Site Description and Background

The following sections provide relevant facility and background information.

2.1 Facility Description

NSF Dahlgren is in Dahlgren, Virginia, approximately 40 miles south of Washington, D.C., on the western bank of the Potomac River. NSF Dahlgren encompasses two areas: the Mainside and the Explosives Experimental Area (EEA) (see Figure 2). The EEA is an isolated weapon testing range occupying 1,641 acres. The Mainside, with 2,677 acres, contains gun ranges and a decommissioned airfield. Additional operations on the Mainside include laboratories, computer facilities, administrative buildings, and a residential area.

Little historical documentation is available regarding early use and handling of G-RAM at NSF Dahlgren. Radium in the form of radioluminescent paint was used in aircraft and marine vessels on dials and markers. There has been no evidence the NSF Dahlgren conducted aircraft or watercraft maintenance activities where these types of radioactive materials were generally handled. NSF Dahlgren's historical and current use of byproduct materials includes sealed and unsealed radioactive calibration sources (solid, gas, and liquid) contained within instrumentation used for tracer diffusion/separation studies, materials and air analyses, and chemical and biological detection. Other uses of radioactive sources at NSF Dahlgren are static elimination devices, smoke detectors, optical sight lenses, thoriated tungsten welding rods, and gas chromatography and liquid scintillation instrumentation. Misch metal, which is composed of thorium and other rare earth metals, was also used at NSF Dahlgren as a component of incendiary weaponry. Industrial waste disposal and waste burial areas may also contain these commodities, materials, and other sources of G-RAM. Portions of the Mainside and EEA Range were used to test small caliber projectiles containing Depleted Uranium or Depleted Uranium alloys. The four known sites have been remediated.

The NRC and its predecessor agency, the Atomic Energy Commission (AEC), exercised licensing and regulatory authority over radioactive materials classified as byproduct material, source material, and special nuclear material used at NSF Dahlgren. With the establishment of the AEC in 1954, procurement and use of radioactive materials became more stringently controlled. Users were required to submit lengthy license applications, with different license types required for byproduct, source material, or special nuclear material. The AEC required the license applicants to include the quantity of each radionuclide to be possessed at any one time, document the purposes for which the licensed material would be used, and specify the location where the radioactive material would be used. The application also required the user to

document the qualifications of the Radiation Safety Officer and demonstrate that the facilities would be adequate to safely control materials and protect human health. The user was required to demonstrate administrative and managerial controls, monitoring procedures and instrumentation, material receipt and accountability procedures, occupational radiation safety program for workers, standard operating and emergency procedures, and radioactive waste disposal procedures.

The AEC was dissolved when the Energy Reorganization Act of 1974 established two new federal agencies to administer and regulate atomic energy activities: the Energy Research and Development Administration and the NRC. The NRC assumed responsibilities for regulation of the byproduct, source material, and special nuclear material previously controlled by the AEC.

In 1987, the NRC granted a Master Materials License to the Chief of Naval Operations, which allows the Navy to issue and inspect Naval Radioactive Materials Permits (NRMPs) in lieu of the Navy issuing individual NRC licenses for uses of radioactive materials at specific Navy and Marine Corps commands. Implementation of the NRMP Program in 1987 included conversion of NRC licenses issued to the Navy and Marine Corps to NRMPs. The NRMP Program is managed by the Naval Radiation Safety Committee (NRSC) with technical support provided by the Navy and Marine Corps Public Health Center for medical uses of radioactive materials and NAVSEA DET Radiological Affairs Support Office for nonmedical operations. The NRSC issues byproduct, source, and special nuclear material NRMPs. Radioactive materials associated with naval nuclear propulsion or nuclear weapons programs are not covered under the license.

2.2 Areas to be Evaluated in the Preliminary Assessment

Table 1 presents the 82 areas that will be included in the PA for NSF Dahlgren. These locations are shown on Figure 3. Note that some of these areas will be discussed in the PA report in more detail than others, depending on the likelihood of G-RAM being present at these areas. Also, a few areas are currently within active ranges and some of them may not be ER,N-eligible until the range closes. This will be discussed in more detail in the PA report.

3.0 Preliminary Assessment Approach/Methodology

This section presents the tasks that will be completed as part of the overall research and analysis portion of the PA. This research and analysis task is being conducted to gather information to help meet the objectives of the PA presented in Section 1.2. Briefly, these objectives include providing a summary of the areas, developing the CSM, and providing recommendations regarding whether the area needs to proceed to an SI.

3.1 Collection and Review of Available Information

The first part of the research and analysis task is to collect and review available documents and reports, interview people familiar with the areas (see Section 3.4), and use information obtained during site reconnaissance (see Section 3.2) to do the following:

- Provide a site description, operational history, and potential for historical radiological use at the area.
- Determine the current site status regarding projects and activities involving the use of radioactive material introduced at each area and/or the cessation of site operations related to the use of radioactive material.
- Obtain information concerning geology underlying the immediate vicinity of the areas.
- Map locations of surface water bodies, fisheries, wetlands, and sensitive environments within the facility and specifically adjacent to the areas.
- Identify migration pathways for potential radiological materials based on the site setting, materials potentially used at the area, and how those materials were likely handled.
- Determine general location of public and private drinking water supply wells, irrigation wells, and surface water intakes within 1 mile of the installation boundary. The PA will not include specific street addresses or marks on the map with the well locations due to homeowner privacy, but the PA report will indicate that there are XXX wells located with a 1- mile area. Although under PA guidance (USEPA, 1991), drinking water supplies and surface water intakes are usually identified within 4 miles of the site boundary for PAs, that distance is used for hazard ranking scoring purposes, which is not the intent of this PA. Therefore, locating public drinking water supply wells and surface water intakes within 1 mile of the installation boundary is more than adequate for this PA.

- Identify residential populations in the vicinity of the area.

The information above will be determined from a review of existing documents and/or publicly available databases. No additional site-specific investigations are planned to obtain this information other than the site visit discussed below.

Part of this task will be to identify any data gaps that may hinder decisions regarding dispositioning the areas or add to the uncertainties in any decisions. Potential data gaps may arise from the absence of items such as:

- Base records documenting types and quantities of materials disposed of at on-site burial facilities.
- Inventories of radioactive materials used, stored, or surplused during base operations.
- Base records regarding radiological survey and monitoring reports.

3.2 Site Visit

The purpose of conducting a site visit is to supplement the document review presented in Section 3.1 by gathering information to help with development of the CSM, to identify potential radiological activities, and to determine current site status. The site visit may be used for review of historical records located at the facility to determine potential presence or absence of radiological releases combined with visual observations of current site conditions to assess presence or absence of radiological releases. A minimum of three people will conduct the site visit for the facility: a radiological SME, a geologist/environmental scientist familiar with the facility, and a Health Physicist Project Manager from RSCS.

In addition to gathering information for the PA, the field team will be refining activities necessary for the SI, including, but not limited to: determining site preparation needs, determining survey area size, identifying obstacles and logistical constraints, and determining site access. Although it is unlikely that all areas evaluated in the PA will move forward to an SI, information will be gathered during the site visit for many of the areas, as necessary, to help determine whether an area will proceed to an SI. However, because some preliminary research will be conducted prior to preparing the PA report, it is expected that not all the areas listed in Table 1 will need to be viewed during the site visit.

Prior to the site visit, maps and figures for each area identified in Table 1 will be generated to assist in note taking, photographic location documentation, etc. In addition, a checklist was created to streamline the collection of information in an

efficient and consistent manner at each of the areas (Attachment A). This checklist will document key items from the site visit that will aid in developing the CSM such as the site layout, habitat, surrounding area, and potential migration pathways. The checklist for each area will be completed electronically in the field using a mobile tablet or cell phone. As part of the data collection process for the site visit, the mobile tablet or cell phone will also be used to take photographs of each area.

Once the data are collected and submitted, the information will be synchronized to a database. The data can also be exported to an Excel spreadsheet, which can be viewed and edited, as necessary. Ultimately, organized field forms for each area that include related data and pictures will be generated for inclusion in final reports.

3.3 Summary of Naval Archive/Naval Aviation Archive Review

The Naval History and Heritage Command maintains historical naval records at numerous locations throughout the United States. Of interest are the records maintained at Naval Archive and Naval Aviation Archive located at the Navy Yard in Washington, D.C. The Naval Archive maintains historical records of base operations. The Naval Aviation Archive maintains Aviation Squadron Histories and Command Operations Reports. Both sets of records document activities and operations conducted at naval bases and with aviation squadrons. The records became progressively more detailed over the years and provide annual reports on the activities carried out to maintain base operations.

The review of these records will concentrate on operations that dealt with radiological commodities. These could include radioactive engine components, ordnance, and electronics containing radioactive dials and switches. The review will identify what types of radioactive commodities were used and often where and when they were in service.

3.4 Summary of Interviews

Several interviews related to the use, handling, and disposal of radiological materials were conducted as part of previous non-CERCLA investigations in 2017.

Documentation of these interviews will be reviewed and included in this PA.

Furthermore, these individuals may be re-interviewed to determine if they have new information to offer. Supplemental interviews of new individuals will primarily be targeted to identify additional information to fill in data gaps; it is not the intent of this investigation to re-interview all personnel contacted during previous investigations. A PA interview questionnaire is included in Attachment B. The types of people that will be interviewed will include:

- Facility environmental leads

- Radiological safety officers
- Public works officers
- Public information officers
- Fire marshal

3.5 Data Evaluation

The principal objective of the PA is to determine if there is evidence of a release of radiological materials at an area, or that a release had a significant potential to have occurred, that warrants the area proceeding to an SI. CSMs will be developed for each area as part of the PA. Multiple areas with similar potential sources, release mechanisms, transport pathways, exposure pathways, and receptors may reference the same CSM as opposed to generating separate CSMs for each area.

Data generated during the research phase of the PA will be evaluated to determine:

- The potential for leaks, spills or releases from the use of radioactive material during base operations.
- The levels of radiological controls and radiological surveillance incorporated into base operations involving the use of radioactive material.
- Radioactive material use, storage, and disposal practices.
- Likelihood for any releases to have migrated into other media (i.e., soil, surface water, sediment, groundwater).
- Potential human and ecological receptors that could be affected by the release or migration of radioactive materials.

When conducting radiological site investigations, it is often assumed that certain types of activities such as on-site disposal, burial, and landfill operations are by default potentially impacted with radioactive material due to the lack of operational records documenting what waste streams were involved in the disposal process. Data will be evaluated to determine if site operations posed a reasonable certainty that radioactive material could have been introduced into the disposal process for sanitary and construction debris landfills with minimal historical records, burn pits, or other similar facilities. The evaluation will also consider facility and site mission-specific activities that are by default considered radiologically impacted to determine if there was a potential for radioactive materials to actually have entered the waste stream, such as in chemical disposal areas.

As areas are evaluated for radiological contamination, those needing further investigation will be reviewed to determine if pathways exist for the introduction of radioactive material into the environment.

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4.0 Overall Project Approach and Deliverables

This section presents a summary of the project approach and deliverables through the entire project, not just the PA portion. The following are the primary presentations/documents that are expected to be prepared as part of this project, in addition to this PA Work Plan:

- **PA Report:** This report will summarize and present the findings of the PA and will include recommendations regarding whether specific areas need to proceed to an SI.
- **Pre-SI Work Plan Presentation:** The objective of this presentation is to describe the preliminary approaches for conducting the SI at each of the areas, including the surveys and sampling that will be conducted. The Data Quality Objectives and background evaluations will also be presented at that time.
- **SI Work Plans:** This task will include the preparation of various documents related to the SI activities including:
 - **Uniform Federal Policy SAP** which describes the objectives, procedures, and specific quality assurance and quality control activities associated with planned field activities in support of radiological surveys.
 - **APP and SSHP** describes the health and safety procedures that will be followed for the radiological surveys.
 - **BRMP** describes general survey and decontamination procedures and methodologies that will be implemented in support of radiological surveys along with radiological controls and radiation safety program elements.
 - **TSP** provides the details for the radiological surveys that will be conducted at the specific areas.
- **SI Activities:** After approval of the SI Work Plans, the SI activities will be implemented.
- **SI Report:** This report will present the findings of the SI and will include recommendations regarding whether any follow-up actions are needed for the areas.

In conformance with the Tetra Tech Corporate Policy, a senior-level technical peer review of all deliverables will be performed to confirm that calculations are accurate and assessments are technically complete. Technical comments developed by the senior

reviewers will be distributed to the appropriate technical leads. All comments will be addressed by the technical leads, and any necessary modifications made to the documents will be reviewed by the peer reviewers prior to publication of the documents. The status of any significant comments will be tracked by the Project Manager to ensure that they are resolved. The documents will also be reviewed by a technical editor prior to submittal.

The project is being completed in an iterative process, as each step will build on the previous steps. For example, as a result of the activities conducted as described in Section 3, it is likely that several areas initially evaluated in the research task will not require further evaluation as part of an SI because the likelihood of a potential radiological release is low. However, other areas will likely proceed to an SI, and based on the CSM, recommendations will be made for the types of investigations to conduct and media to sample. In an effort to keep the project team involved throughout the process, meetings and/or conference calls will be held, as necessary, to discuss planning the next phases of the project, summarize findings, and resolve comments on various project deliverables.

The end product of the PA is the identification of areas that require further radiological investigation during the SI phase. These investigations could consist of MARSSIM scoping surveys of the affected area along with sampling of various media (see Figure 1).

Attachment C presents responses to EPA and Virginia Department of Environmental Quality comments on the Draft Radiological Preliminary Assessment Work Plan.

5.0 References

DON (Department of Navy), 2018. *Department of the Navy Environmental Restoration Program Manual*.

EPA (Environmental Protection Agency), 1991. *Guidance for Performing Preliminary Assessments Under CERCLA*. September.

EPA, DOE, DOD, and NRC (Environmental Protection Agency, Department of Energy, Department of Defense, and Nuclear Regulatory Commission), 2000. *Multi-Agency Radiation Survey and Site Investigation Manual (MARSSIM)*. August.

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TABLES

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Table 1: Areas Included in the Radiological Preliminary Assessment for NSF Dahlgren
Page 1 of 3

Area	Name/Description
Sites and SWMUs	
Site 1	Old Bombing Range
Site 2	Fenced Ordnance Burial Area
Site 3	Ordnance Burn Structure
Site 4	Case Storage Area
Site 5	Projectile Disposal Area
Site 9	Disposal Burn Area
Site 10	Hideaway Pond
Site 12	Chemical Burn Pit
Site 14	CW Evaporation Pond
Site 15	Scrap Area
Site 17	1400 Area Landfill
Site 18	Classified Documents Incinerator Sewage Holding Tank
Site 19	Transformer Draining Area
Site 20	Former Electroplating Waste UST
Site 21	Gun Barrel Decoppering Area
Site 22	Gun Barrel Degreasing Area, North Main Range
Site 23	Building 480 Lot (PCB Storage)
Site 25	Pesticide Rinse Area
Site 28	Gambo Creek Compost Area
Site 29	Battery Service Area
Site 31	Airplane Park Dump, EEA
Site 32	Fast Cook-off Pit and Pond, EEA
Site 33	Otto Fuel Spill
Site 34	Barbette
Site 36	Depleted Uranium Mound, Pumpkin Neck, EEA
Site 37	Lead Contamination Area
Site 38	Building 1349 Pest Control Outside Area
Site 39	Open Storage Area Main Battery
Site 40	Building 120B DRMO Lot
Site 41	Compost Area
Site 43	Higley Road Land Application Area
Site 44	Rocket Motor Pit
Site 45	July 28, 1992 Landfill B
Site 46	July 28, 1992 Landfill A: Stump Dump Road
Site 47a	WWI Munitions Mound
Site 47b	EOD Scrap Area
Site 48	Building 448 Tar Tank Area
Site 49	Depleted Uranium Gun Butt
Site 50	Fill Areas Northeast EEA
Site 51	Battery Locker Acid Draining Area
Site 52	OWS 107-350 (Yardcraft Area)

Table 1: Areas Included in the Radiological Preliminary Assessment for NSF Dahlgren
Page 2 of 3

Area	Name/Description
Site 53	OWS 207-300
Site 54	OWS 1121-Old
Site 55	Cooling Pond
Site 56	Gun Barrel Degreasing Area, Railway Spur
Site 57	Shell House Dump
Site 58	Building 1350 Landfill
Site 59	Octagon Pad Dump, EEA
Site 60	Building 445 Star Gauge Loading Dock
Site 61a	Gambo Creek Ash Dump
Site 61b	Gambo Creek Projectile Disposal Area
Site 62	Building 396
Site 63	Building 198 Neutralization Tank
Site 64	Gum Alley Disposal Area
SWMU 3	Building 194 Accumulation Area (Concrete Pad)
SWMU 15	Building 120B Contractor Staging Area
SWMU 23	Building 456 Oil Waste Drum
SWMU 27	Tank 280 Contractor Staging Area
SWMU 31	Gambo Creek Truck Wash Area
SWMU 54	Terminal Range Airplane Park
SWMU 61	Paint Can Crusher
SWMU 62	Paint Can Dumpster
SWMU 64	Building 448 Sand Blast Area
SWMU 70	Building 152 TCA Accumulation Area
SWMU 77	Building 1329 Wash Area
SWMU 78	Building 1121 Former Waste Oil UST
SWMU 82	Electroplating Line and WWT
SWMU 101	Building 155 Auto Shop Waste Oil Filter and UST
SWMU 115	Building 1282 Auto Hobby Outside Used Oil Storage
SWMU 119	Building 1282 Auto Hobby Used Oil Tank
SWMU 127	OWS 1121-300, OWS 115-350, OWS 402-30,000, and OWS 486- 1000
SWMU 130	Yardcraft Oil Storage Area
Buildings and Other Areas	
Additional Areas X6	South Hangar Former Tank Area
AOC O	Building 1369 Pesticide Spill Area
AOC Z	Terminal Range Building 109
Building 126	Former Powder Magazine
Building 200	Bay 4 & Outdoor areas
Bone Yard, EEA	Former wreckage storage area
Elsie Blocks	Former atomic weapon testing site
Other Units C3	Scar at Phalanx Test Area
Other Units C6	Former Radio Test Area
Outdoor Area Near Building 1180	Current Vibration Test Facility

Table 1: Areas Included in the Radiological Preliminary Assessment for NSF Dahlgren
Page 3 of 3

Note: Some areas listed above may not currently be ER,N-eligible because they are located within an active range. However, the areas may be evaluated under the ER,N program when the range is no longer active.

The ER,N-eligibility of these areas will be discussed in the Preliminary Assessment Report.

AOC - Area of Concern

CW - Chemical Weapon

DRMO - Defense Reutilization and Marketing Office

EEA - Explosives Experimental Area

EOD - Explosive Ordnance Disposal

ER,N - Environmental Restoration, Navy

OWS - Oil/Water Separator

PCB - Polychlorinated Biphenyl

SWMU - Solid Waste Management Unit

TCA - Trichloroethane

UST - Underground Storage Tank

WWI - World War I

WWT - Waste Water Treatment

Table 2: Site Number Crosswalk Table for NSF Dahlgren
Page 1 of 2

Navy Site Number	EPA Number	Name
Site 1	AOC J	Old Bombing Range
Site 2	SWMU 46	Fenced Ordnance Burial Area
Site 3	SWMU 42	Ordnance Burn Structure
Site 4		Case Storage Area
Site 5	SWMU 51	Projectile Disposal Area
Site 6	SWMU 54	Terminal Range Airplane Park
Site 9	SWMU 19	Disposal Burn Area
Site 10	AOC N	Hideaway Pond
Site 12	SWMU 44	Chemical Burn Pit
Site 13	SWMU 31	Gambo Creek Truck Wash Area
Site 14	SWMU 28	CW Evaporation Pond
Site 15		Scrap Area
Site 17	SWMU 30	1400 Area Landfill
Site 18	AOC X	Classified Documents Incinerator Sewage Holding Tank
Site 19	AOC G	Transformer Draining Area
Site 20	SWMU 83	Former Electroplating Waste UST
Site 21	SWMU 52	Gun Barrel Decoppering Area
Site 22	SWMU 53	Gun Barrel Degreasing Area, North Main Range
Site 23	SWMU 72	Building 480 Lot (PCB Storage)
Site 25	SWMU 66	Pesticide Rinse Area
Site 28	SWMU 131	Gambo Creek Compost Area
Site 29	SWMU 79	Battery Service Area
Site 31	SWMU 6	Airplane Park Dump, EEA
Site 32	AOC F	Fast Cook-off Pit and Pond, EEA
Site 33	AOC A	Otto Fuel Spill
Site 34		Barbette
Site 36	AOC C1	Depleted Uranium Mound, Pumpkin Neck, EEA
Site 37	SWMU 108	Lead Contamination Area
Site 38	AOC I	Building 1349 Pest Control Outside Area
Site 39	AOC X7	Open Storage Area Main Battery
Site 40	SWMU 14	Building 120B DRMO Lot
Site 41	SWMU 20	Compost Area
Site 43	SWMU 35	Higley Road Land Application Area
Site 44	SWMU 41	Rocket Motor Pit
Site 45	SWMU 45	July 28, 1992 Landfill B
Site 46	SWMU 47	July 28, 1992 Landfill A: Stump Dump Road
Site 47a	SWMU 50	WWI Munitions Mound
Site 47b	AOC K	EOD Scrap Area

Table 2: Site Number Crosswalk Table for NSF Dahlgren
Page 2 of 2

Navy Site Number		EPA Number	Name
Site	48	SWMU 67	Building 448 Tar Tank Area (referred to as Building 448 Oil Storage Area in crosswalk table in the SMP).
Site	49	AOC C4	Depleted Uranium Gun Butt
Site	50	AOC X9	Fill Areas Northeast EEA
Site	51	SWMU 98	Battery Locker Acid Draining Area
Site	52	SWMU 125	OWS 107-350 (Yardcraft Area)
Site	53	SWMU 126	OWS 207-300
Site	54	SWMU 128	OWS 1121 - Old
Site	55	SWMU 129	Cooling Pond
Site	56	SWMU 132	Gun Barrel Degreasing Area, Railway Spur
Site	57	SWMU 133	Shell House Dump
Site	58	SWMU 134	Building 1350 Landfill
Site	59	SWMU 135	Octagon Pad Dump, EEA
Site	60	SWMU 57	Building 445 Star Gauge Loading Dock
Site	61a		Gambo Creek Ash Dump
Site	61b		Gambo Creek Projectile Disposal Area
Site	62		Building 396
Site	63		Building 198 Neutralization Tank
Site	64		Gum Alley Disposal Area

Source of Table:

Final Environmental Restoration SMP, 2017, for NSF Dahlgren (2017).

Note: Only sites in Table 1 that have an associated SWMU or AOC number are included in this table.

AOC - Area of Concern

CW - Chemical Weapon

DRMO - Defense Reutilization and Marketing Office

EEA - Explosives Experimental Area

EOD - Explosive Ordnance Disposal

OWS - Oil/Water Separator

PCB - Polychlorinated Biphenyl

SMP - Site Management Plan

SWMU - Solid Waste Management Unit

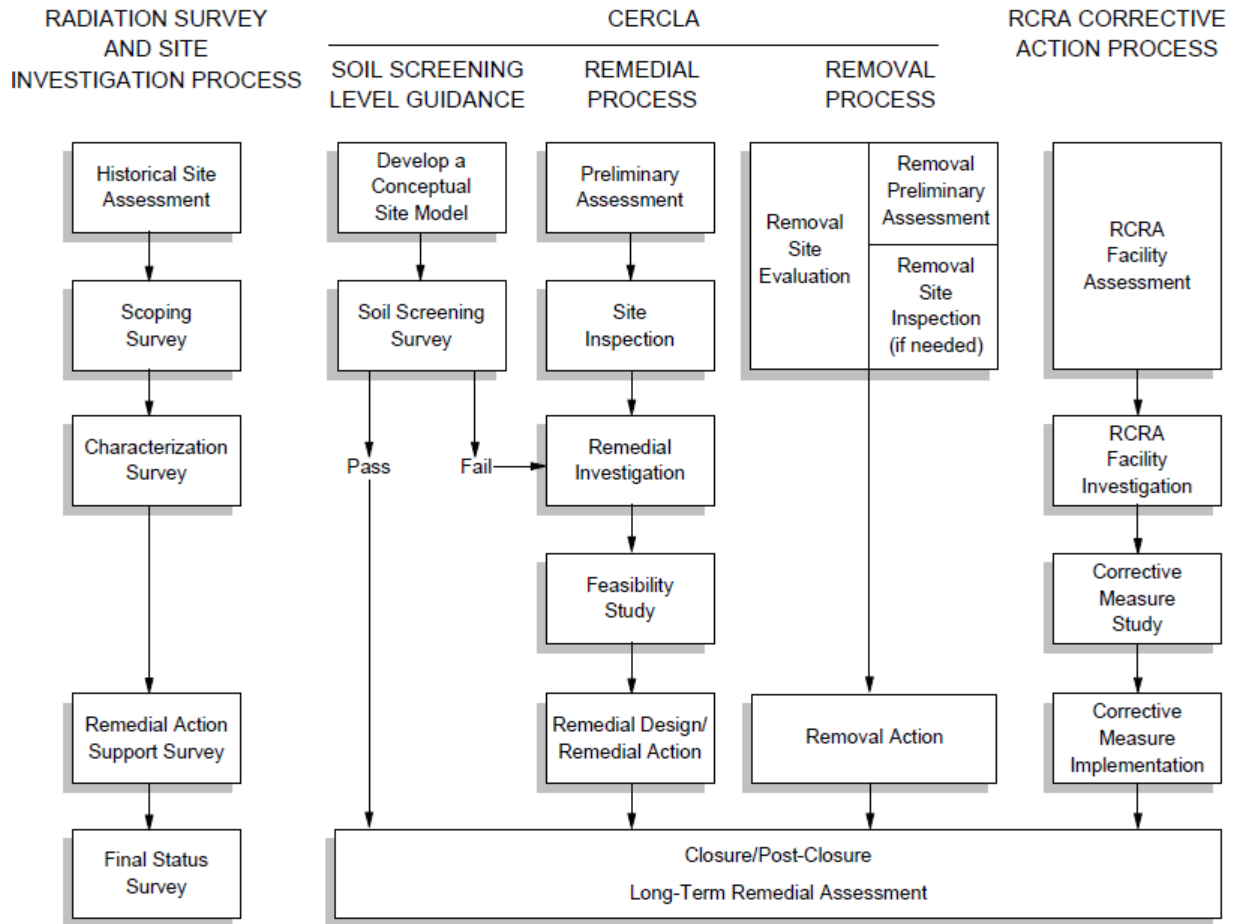
UST - Underground Storage Tank

WWI - World War I

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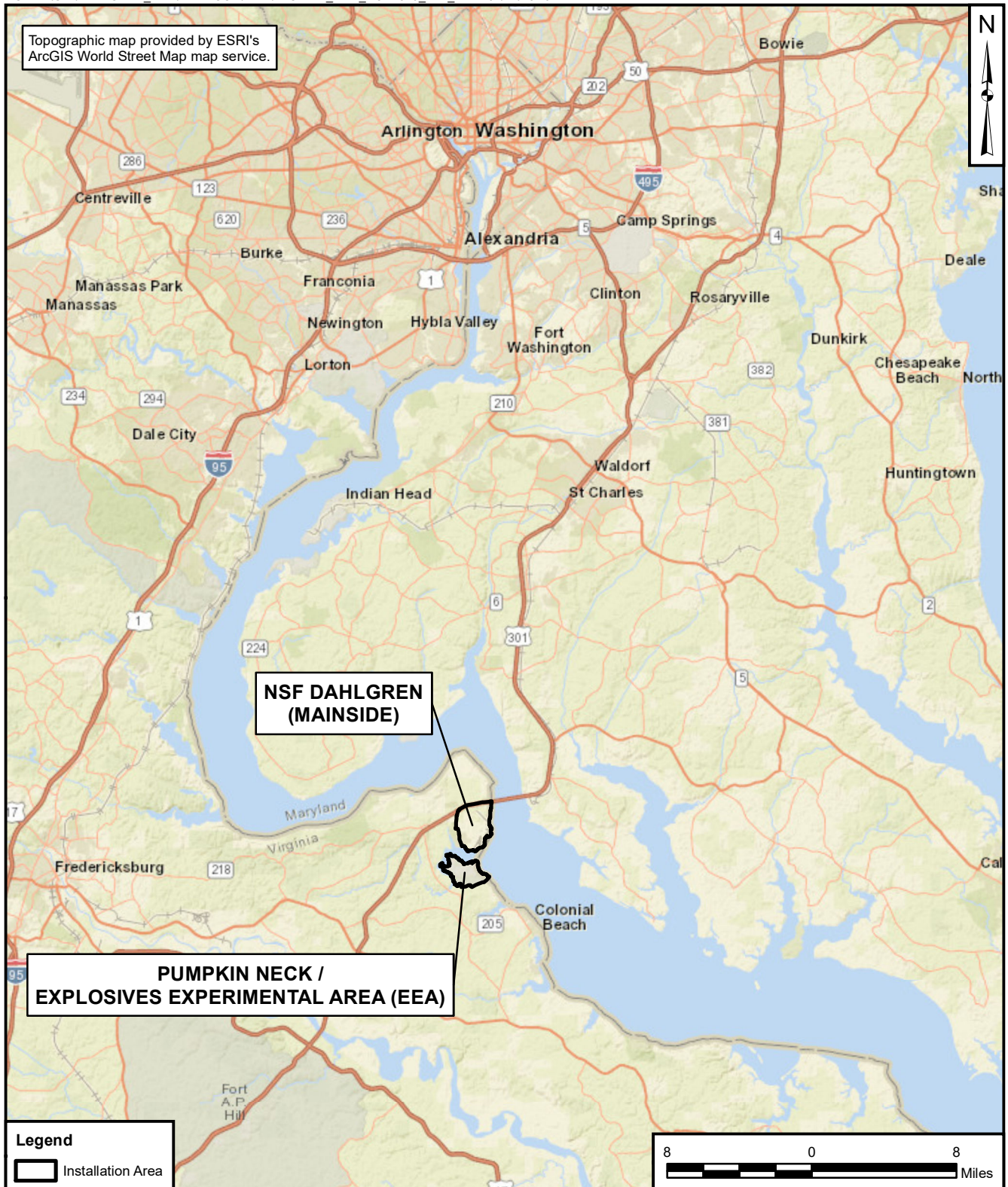
FIGURES

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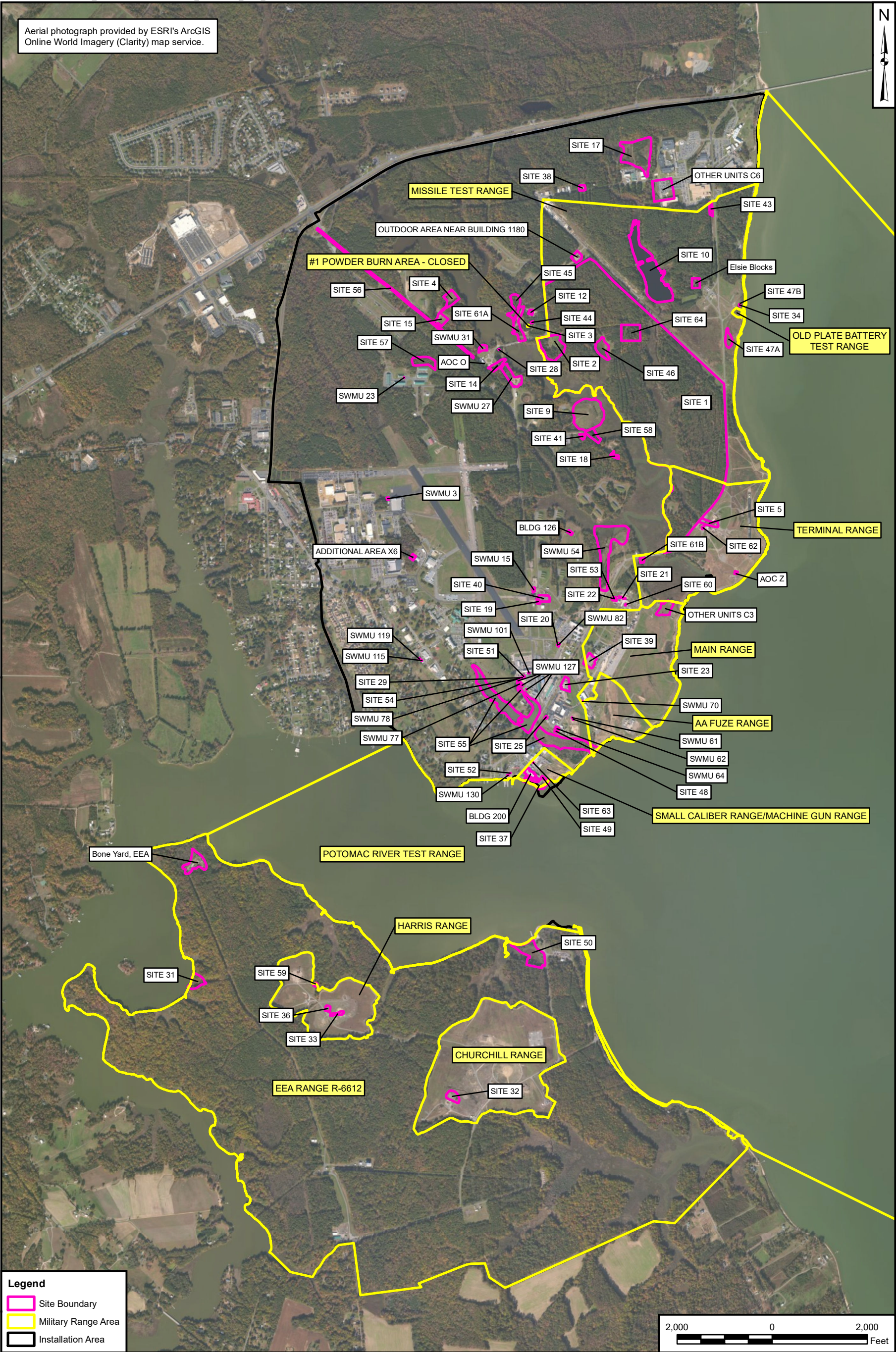
Source: the Multi-Agency Radiation Survey and Site Investigation Manual (MARSSIM) (USEPA, DOE, DOD, and NRC, 2000)
 CERCLA = Comprehensive Environmental Response, Compensation, and Liability Act
 RCRA = Resource Conservation and Recovery Act

Figure 1: Comparison of the Radiation Survey and Site Investigation Process with the CERCLA Superfund Process and the RCRA Corrective Action Process



**SITE LOCATION MAP
NAVAL SUPPORT FACILITY DAHLGREN
DAHLGREN, VIRGINIA**

CTO N4008019F4808	
DRAWN BY J. ZAMUDIO	DATE 04/14/20
CHECKED BY L. MIHALKO	DATE 04/14/20
FIGURE NUMBER 2	



LOCATION OF AREAS TO BE EVALUATED IN THE PRELIMINARY ASSESSMENT
NAVAL SUPPORT FACILITY DAHLGREN
DAHLGREN, VIRGINIA

CTO N4008019F4808	
DRAWN BY K. MOORE	DATE 06/24/20
CHECKED BY A. BERNHARDT	DATE 02/04/21
FIGURE NUMBER 3	

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ATTACHMENT A
CHECKLIST FOR SITE VISIT

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General Radioactive Material (G-RAM) PA Site Visit Checklist

Installation: **Drop-Down Menu (Pick One)**

- NSF Indian Head
- NSF Dahlgren
- NSA Carderock

Date/Time: _____

Reconnaissance Completed by (Name/Title/Phone #): **Drop-Down Menu (Pick One)**

- **Will add names as they are determined**
- Lawson Bailey

People Present During Reconnaissance (Name/Title/Phone #): **Drop-Down Menu (Pick Multiple)**

- **Will add names as they are determined**
- Lawson Bailey
- RSCS Representative
- Facility Representative
- Other: (If other, prompt to describe)

SITE DESCRIPTION

Site Name: **Drop-Down Menu (Pick One)**

1. Drop-down menu with each of the sites and when a site is selected, the following information will be pre-populated (when available):
 - Brief Site Description
 - Coordinates
 - Approximate size of the site
 - Years of operation
 - Past/current site operation
 - Known/suspected sources of contaminants
 - Quantities of waste
 - Physical state of waste
 - Specific areas where G-RAM may have been disposed, deposited, stored, or handled
 - Known releases of G-RAM (Yes/No)
 - Removal actions (Yes/No)
2. Site status: **Drop-Down Menu (Pick One)**
 - Active
 - Inactive
 - Other (If other, prompt to describe)
3. Current Site Layout: **Drop-Down Menu (Pick Multiple)**
 - Building
 - Parking lot (asphalt)
 - Parking lot (concrete)
 - Parking lot (gravel)
 - Landscaped Grass
 - Open field
 - Wooded
 - Other (if other, prompt to describe)
 - Comments (space for comments)
4. Check any of the following materials that have been or currently are handled, stored, used, or disposed of onsite: **Drop-Down Menu (Pick Multiple)**
 - Radioactive check or calibration sources
 - Radioluminescent devices (dials, gauges and markers)
 - Radioluminescent paint
 - Depleted uranium counterweights
 - Depleted uranium rounds

- Spark gap irradiators and vacuum tubes containing radioactive material
 - Tritium exit signs or tritium gun sights
 - Thoriated glass lens or prisms (i.e., sights, prisms, turrets)
 - Other (if other, prompt to describe)
 - Comments (leave space for comments)
5. Have any facility demolition and/or construction of new facilities occurred other than what is described as the current conditions in Item #1 above? **Drop-Down Menu (Pick One)**
- No
 - Yes (If yes, prompt to describe)
6. Describe the accessibility of the site/source area(s): **Drop-Down Menu (Pick Multiple)**
- Open access
 - Fenced (unlocked)
 - Fenced (locked)
 - Down an embankment
 - Overgrown with vegetation
 - Barriers blocking access
 - Other (if other, prompt to describe)
 - Comments (space for comments)

MIGRATION PATHWAYS

Check applicable contaminant migration pathways and fill out the corresponding sections below. Groundwater is not included below because this is not a pathway that will be checked during the site visit.

Drop-Down Menu (Pick Multiple) (If box is selected, appropriate sections will be opened)

- Surface Water
- Soil
- Air

Surface Water

1. Is the direction of overland runoff apparent from site observations? **Drop-Down Menu (Pick One)**
 - No
 - Yes (if yes, Question #2 will be prompted)
2. If yes, to which of the following does the surface runoff discharge: **Drop-Down Menu (Pick Multiple)**
 - Surface Water
 - Sewer
 - Collection Impoundment
 - Other (if other, prompt to add text)
 - Comments (prompt to describe overland runoff routes and prompt to identify on a site map)
3. Is there any evidence of flooding? **Drop-Down Menu (Pick One)**
 - No
 - Yes (if yes, the following will be prompted "Describe the evidence" and space will be available for an answer)
4. Do waterbodies or wetlands exist on or in the vicinity of the site? **Drop-Down Menu (Pick One)**
 - No
 - Yes (if yes, the following will be prompted "identify approximate distance and describe setting" and space will be available for an answer)
5. Comments for other applicable items

Soil

1. Any areas of known or suspected soil contamination (e.g. gravel fill, waste pile, landfills, drums, tanks). ***Drop-Down Menu (Pick One)***
 - No
 - Yes (if yes, space to describe areas and prompt to identify on a site map)
2. Is the area covered by an essentially impenetrable cover (e.g. asphalt, concrete) of more than 2 ft? ***Drop-Down Menu (Pick One)***
 - No
 - Yes (if yes, space to describe areas and prompt to identify on a site map)
 - Unknown
3. Comments for other applicable items

Air

1. Any known or historical monitored stacks or air discharge points? ***Drop-Down Menu (Pick One)***
 - No
 - Yes (if yes, the following will be prompted “Describe” and space will be available for an answer)
2. Comments for other applicable items

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ATTACHMENT B
PA INTERVIEW QUESTIONNAIRE

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**NAVAL SUPPORT FACILITY DAHLGREN
RADIOLOGICAL PRELIMINARY ASSESSMENT
MASTER INTERVIEW SHEET**

Date/Time of Interview: _____

Location of Interview: _____

Name of Interviewer: _____

Affiliation: _____

Name of Interviewee: _____

Address (Optional): _____

Telephone (Optional): _____

Email Address (Optional): _____

Employed or performed work at NSF Dahlgren and/or outlying facilities?

Yes or No

If Yes,

Position(s) _____

Period(s) of work _____

Location(s) worked _____

If No,

Association with installation _____

All comments will be considered in preparation of the assessment report. All comments, including personal information provided, are subject to the Freedom of Information Act and may be made publicly available at anytime.

1. What types of activities did you perform at NSF Dahlgren?

2. Are you aware of operations involving radioactive materials at NSF Dahlgren? For example:

- use of any radioactive check or calibration sources;
- aircraft or ship maintenance;
- use, handling, refurbishment, painting, or disposal of radioluminescent devices (dials, gauges and markers);
- handling, repair, storage, and disposal of depleted uranium counterweights;
- handling, use, and storage of depleted uranium rounds;
- handling, use, and disposal of spark gap irradiators and vacuum tubes containing radioactive material;
- handling, repair, and storage of tritium exit signs or tritium gun sights;
- use or disposal of thoriated glass lens or prisms;
- smelting, incinerator, or open burning operations;
- Defense Reutilization and Marketing Office (DRMO) material storage areas;
- dredging operations;
- construction operations;
- medical or other research activities (radiopharmaceuticals/drugs);
- waste accumulation areas;
- disposal of ash residue/products, monazite sand or sandblasting materials; etc.

All comments will be considered in preparation of the assessment report. All comments, including personal information provided, are subject to the Freedom of Information Act and may be made publicly available at any time.

3. Do you have specific knowledge of any documents or records pertaining to radioactive/hazardous materials management and/or incineration, disposal, or salvage operations at NSF Dahlgren?

a. If so, where are/were the documents/records located (refer to property map) and what types of information do/did they contain?

4. Do you have specific knowledge of any landfill, disposal area, burn area, incinerator, or salvage areas located at NSF Dahlgren or affiliated sites? Are you aware of any of these sites receiving hazardous and/or radioactive materials?

a. If so, where are/were the areas located (refer to property map) and how were they used? Please describe what you observed.

5. Are you aware of any radioactive material that might have been disposed of using sanitary drains?

a. If so, what types of materials and where were they disposed?

6. Do you have knowledge of aircraft maintenance operations that have/may have included maintenance, removal, or refurbishment of radioactive instruments, lenses, sights, counterweights, or other radioactive components that occurred at NSF Dahlgren?

- a. If so, where have/may have these operations occurred (refer to property map)? Please describe what you observed and/or level of involvement and include building name and number if known.

7. Do you have knowledge of aircraft accidents/crashes that occurred at NSF Dahlgren?

- a. If so, where have/may have they occurred (refer to property map) and what was your involvement?

8. Do you have knowledge of radioactive material spills, decontamination, or clean-up activities occurring at NSF Dahlgren?

- a. If so, where have/may have they occurred (refer to property map) and what was your involvement? Please describe what you observed.

9. Are you aware of any sampling data for radiological constituents?

10. Do you have knowledge of research, laboratories, or medical facilities/activities that may have involved radioactive materials or animal studies, neutron generators, particle accelerators, or radioactive material/waste storage at NSF Dahlgren (excluding x-rays and modern nuclear medicine)?

- a. If so, where have/may have they occurred (refer to property map) and what was your involvement? Please describe what you observed.

11. Do you have knowledge of firefighting training activities at NSF Dahlgren? Are you aware of any standard operating procedures that supported this type of training?

- a. If so, where have/may have the training activities taken place (refer to property map)?

- b. What type(s) of material was burned for training activities and where was this material(s) acquired?

- c. If aircraft or vehicles were burned, were they stripped of parts (including radioactive items) prior to burning?

- d. If so, do you know how and where the stripped parts were disposed of?

All comments will be considered in preparation of the assessment report. All comments, including personal information provided, are subject to the Freedom of Information Act and may be made publicly available at any time.

12. Do you have knowledge of any activity or site involved in the support of nuclear weapons testing (1945 to 1962), including any decontamination, maintenance, or storage of contaminated ships, vehicles, or planes?

13. Do you authorize the Navy to publish your responses (personal information will be excluded except your name and signature) to the above set of questions? For phone interviews, does the interviewee provide this authorization? For email responses, is authorization documented?

Yes _____ **No** _____

Signature:

Date:

ATTACHMENT C
RESPONSES TO REGULATOR COMMENTS

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**Responses to Regulator Comments on the
Draft Radiological Preliminary Assessment Work Plan (February 2021)
Naval Support Facility Dahlgren**

Comments from Virginia Department of Environmental Quality (VA DEQ) Dated April 15, 2021

- 1) Section 3.0. Pg. 3-1. Bullet 6. This section stated “Determine the location of public water supply wells...” Please indicate the rationale for excluding the possible presence/location of private water supply wells within 1 mile of the installation boundary.

Response: The number of private drinking water wells within one mile of the installation boundary will be included in the PA report, but the specific locations will not be identified for personally identifiable information (PII) reasons. The sixth bullet in Section 3.1 will be changed to: “Determine general location of public and private drinking water supply wells, irrigation wells, and surface water intakes within 1 mile of the installation boundary. The PA will not include specific street addresses or marks on the map with the well locations due to homeowner privacy, but the PA report will indicate that there are XXX wells located within a 1-mile area. Although under PA guidance (USEPA, 1991), drinking water supplies and surface water intakes are usually identified within 4 miles of the site boundary for PAs, that distance is used for hazard ranking scoring purposes, which is not the intent of this PA. Therefore, locating public drinking water supply wells and surface water intakes within 1 mile of the installation boundary is more than adequate for this PA.”

- 2) Table 1. Please consider providing a table of sites which will not be evaluated in the RAD PA; along with the rationale for screening them out.

Response: All Navy areas that are eligible for environmental restoration funding will be evaluated in the PA report, although not all of them will be recommended for proceeding to a Site Inspection. Areas that are not eligible for environmental restoration funding, such as buildings where a release to the environment has not occurred, will not be evaluated in the PA report. Therefore, the Navy does not believe it is necessary to include a table for those areas in the PA report.

Comments from United States Environmental Protection Agency Dated May 6, 2021

- 1) Please indicate the rationale for excluding the possible presence/location of private water supply wells within 1 mile of the installation boundary.

Response: Please see the response to VA DEQ Comment No. 1.

- 2) Please consider providing a table of sites which will not be evaluated in the RAD PA; along with the rationale for screening them out.

Response: Please see the response to VA DEQ Comment No. 2.



COMMONWEALTH of VIRGINIA

DEPARTMENT OF ENVIRONMENTAL QUALITY

Street address: 1111 E. Main Street, Suite 1400, Richmond, Virginia 23219

Mailing address: P.O. Box 1105, Richmond, Virginia 23218

www.deq.virginia.gov

Matthew J. Strickler
Secretary of Natural Resources

David K. Paylor
Director

(804) 698-4000
1-800-592-5482

April 15, 2021

Mr. Alex E. Scott
Remedial Project Manager
CIV USN NAVFAC Washington
1314 Harwood Street, S.E.
Washington Navy Yard, D.C. 20374

Re: Dahlgren Radiological PA WP (Draft)

Dear Mr. Scott.

The Virginia DEQ Office of Remediation Programs would like to thank you for the opportunity to review the referenced draft Radiological PA WP, dated February 2021. Please see our comments below.

1. Section 3.0. Pg. 3-1. Bullet 6. This section stated "Determine the location of public water supply wells..." Please indicate the rationale for excluding the possible presence/location of private water supply wells within 1 mile of the installation boundary.
2. Table 1. Please consider providing a table of sites which will not be evaluated in the RAD PA; along with the rationale for screening them out.

Should you have any questions or comments with this letter please contact me at 804/698-4427.

Sincerely,

A handwritten signature in black ink, reading "Eric J. Salopek".

Eric J. Salopek
CERCLA Program RPM

Cc: Brian Poe, EPA Region III



**UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION III
1650 Arch Street
Philadelphia, Pennsylvania 19103-2029**

Brian Poe Remedial Project Manager
NPL/BRAC Federal Facilities Branch

Phone: (215) 814-5471
Mail Code: 3HS11

Date: May 6, 2021

Mr. Alex E. Scott
Remedial Project Manager
CIV USN NAVFAC Washington
1314 Harwood St SE Bldg. 212
Washington, DC 20374

Re: Radiological Preliminary Assessment Work Plan, Feb 2021 draft, Naval Support Facility
Dahlgren, Dahlgren, Virginia

Dear Mr. Scott:

The United States Environmental Protection Agency would like to thank you for providing the draft Radiological Preliminary Assessment Work Plan for review and comment. EPA's comments mimic Virginia DEQ's comments on the draft Work Plan and are provided below.

- 1) Please indicate the rationale for excluding the possible presence/location of private water supply wells within 1 mile of the installation boundary.
- 2) Please consider providing a table of sites which will not be evaluated in the RAD PA; along with the rationale for screening them out.

Sincerely,

Brian Poe

Cc'd: Amy McGivney
Aaron Bernhardt
Travis Wray
Dr. Margaret Kasim
Eric Salopek
Jenna O'Brien

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